AMENDMENTS TO THE CLAIMS

1. (Original) A process control system element for use in a process plant having a user interface and one or more process controllers, the process control system element comprising:

a control module adapted to execute on the one or more process controllers to implement process control activities within the process plant;

a graphic display module adapted to produce a graphical depiction of a least a portion of the process plant on the user interface; and

a process simulation module adapted to simulate the operation of one or more physical devices within the process plant being controlled by the control module and depicted in the graphical depiction associated with the graphic display module, wherein the process simulation module is communicatively connected to the control module to communicate data between the process simulation module and the control module during operation of the control module.

2. (Original) The process control system element of claim 1, wherein the graphic display module includes a connection element indicating a type of a connection device disposed between physical devices within the process plant.

3. (Original) The process control system element of claim 2, wherein the connection element indicates a pipe type connection device.

4. (Original) The process control system element of claim 2, wherein the connection element indicates a duct type connection device.

5. (Original) The process control system element of claim 2, wherein the connection element indicates a conveyor type connection device.

6. (Original) The process control system element of claim 2, wherein the connection element includes a connection status parameter indicting a status of the connection device disposed between the physical devices within the process plant.

7. (Original) The process control system element of claim 6, wherein the connection status parameter includes a state indicting that the connection device disposed between the physical devices within the process plant is operationally connected or not connected between the physical devices within the process plant.

8. (Original) The process control system element of claim 6, wherein the connection status parameter includes a state indicting that the connection device disposed between the physical devices within the process plant is running or is not running.

9. (Original) The process control system element of claim 6, wherein the graphic display module is communicatively coupled to the process simulation module to receive one or more simulated parameters from the process simulation module and wherein the connection element is adapted to receive a simulated connection status as one of the one or more simulated parameters and to display the simulated connection status as the connection status parameter.

10. (Original) The process control system element of claim 9, wherein the simulated connection status is adapted to indicate that the connection device disposed between the physical devices is at a limit, is good or is bad.

11. (Original) The process control system element of claim 1, wherein the process simulation module includes a simulation algorithm adapted to simulate process dynamics within the process plant.

12. (Original) The process control system element of claim 1, wherein the process simulation module includes a simulation algorithm adapted to simulate a cost associated with running the process plant.

13. (Original) The process control system element of claim 1, wherein the process simulation module includes a simulation algorithm adapted to simulate an efficiency of one or more elements within the process plant.

14. (Original) The process control system element of claim 1, wherein the graphic display module is communicatively coupled to the process simulation module to receive one or more simulated parameters from the process simulation module and wherein the graphic display module is adapted to produce an animation within the graphical depiction based on the one or more simulated parameters.

15. (Original) The process control system element of claim 1, wherein the process simulation module includes a first portion stored in and adapted to be executed in a first computing device within the process plant and a second portion stored in and adapted to be executed in a second computing device within the process plant.

16. (Original) The process control system element of claim 15, wherein the first portion of the process simulation module is communicatively connected to the second portion of the process simulation module through an external reference.

17. (Original) The process control system element of claim 16, wherein the external reference is a stream element associated with a flow of material within the process plant.

18. (Original) The process control system element of claim 17, wherein the stream element includes multiple parameters identifying the nature of the flow of material within the process plant.

19. (Original) The process control system element of claim 18, wherein the multiple parameters include two or more of a name parameter, a pressure parameter, a density parameter, a temperature parameter, a composition parameter, and a flow rate parameter.

20. (Original) The process control system element of claim 1, wherein the control module is adapted to receive a simulated measurement from the process simulation module and an actual measurement from a device within the process plant.

21. (Original) The process control system element of claim 20, wherein the control module is further adapted to use the simulated measurement from the process simulation module to perform the control activities within the process plant.

22. (Original) The process control system element of claim 21, wherein the control module is adapted to automatically use the simulated measurement from the process simulation module instead of the actual measurement when a status associated with the actual measurement is bad.

23. (Original) The process control system element of claim 1, wherein the control module is adapted to receive a simulated parameter from the process simulation module and to use the simulated parameter to perform the control activities within the process plant.

24. (Original) The process control system element of claim 1, wherein the process simulation module is adapted to receive an output from the control module and to use the output from the control module to perform a simulation operation to simulate the operation of a portion of the process plant.

25. (Original) The process control system element of claim 1, wherein the process simulation module includes a stream element that represents a flow of material within the process plant and a simulation element that simulates the effect of a physical device within the process plant on the stream element.

26. (Original) The process control system element of claim 25, wherein the simulation element includes a simulation algorithm that models the operation of the physical device within the process plant.

27. (Original) The process control system element of claim 26, wherein the simulation algorithm is selectable as one of a number of predefined simulation algorithms.

28. (Original) The process control system element of claim 27, further including a library of predefined simulation algorithms for use in the simulation element.

29. (Original) The process control system element of claim 26, wherein the simulation algorithm is user definable.

30. (Original) The process control system element of claim 29, further including a graphic editor adapted to assist a user in defining the simulation algorithm to use in the simulation element.

31. (Original) The process control system element of claim 1, wherein the process simulation module includes a plurality of interconnected simulation elements, wherein two or more of the simulation elements simulate the operation of different devices within the process plant.

32. (Original) The process control system element of claim 31, wherein the process simulation module further includes a stream element that represents a material within the process plant, wherein the steam element is connected to one or more of the simulation elements within the process simulation module.

33. (Original) The process control system element of claim 31, wherein each of the simulation elements includes a simulation algorithm that models the operation of an associated device within the process plant.

34. (Original) The process control system element of claim 33, wherein the simulation algorithm for one of the simulation elements is selectable as one of a number of predefined algorithms.

35. (Original) The process control system element of claim 34, further including a library of predefined simulation algorithms for use in the one of the simulation elements.

36. (Original) The process control system element of claim 33, wherein the simulation algorithm for one of the simulation elements is user definable.

37. (Original) The process control system element of claim 36, further including a graphic editor adapted to assist a user in defining the simulation algorithm for the one of the simulation elements.

38. (Original) The process control system element of claim 33, further including a high fidelity simulation having portions thereof communicatively connected to the simulation elements of the process simulation module to provide high fidelity simulation parameters to the simulation elements.

39. (Original) The process control system element of claim 38, wherein the process simulation module includes a user operable switch adapted to cause the process simulation module to switch between the use of one or more of the simulation algorithms and the high fidelity simulation.

40. (Original) The process control system element of claim 1, wherein the process simulation module is adapted to produce a simulated parameter indicative of an operation of the process plant and to generate an alarm for display to a user based on the value of the simulated parameter.

41. (Original) The process control system element of claim 40, wherein the simulated parameter is an efficiency parameter.

42. (Original) The process control system element of claim 40, wherein the simulated parameter is a mass balance parameter.

43. (Original) The process control system element of claim 40, wherein the simulated parameter is a cost parameter.

44. (Original) The process control system element of claim 40, wherein the simulated parameter is a vapor state parameter.

45. (Original) The process control system element of claim 1, wherein the process simulation module is adapted to produce a simulated parameter indicative of an operation of the process plant, to receive an output parameter from the control module pertaining to an operation of the process plant, to compare the output parameter from the control module with the simulated parameter and to generate an alarm for display to a user based on the comparison between the output parameter from the control module and the simulated parameter.